

# Chapter 3 Review

## 3.1 Build Algebraic Models Using Concrete Materials, pages 104–109

1. Use algebra tiles to build a model for each situation. Write an algebraic expression to represent the model.
  - a) Jeanne ran 4 km.
  - b) Klaus drove an unknown distance, twice.
  - c) Evelyn ran 3 km plus an unknown distance.
  - d) Suki painted her house with two coats of paint.
2. a) Build a volume model to represent a cube with side length 3 cm. Sketch the model and label the length, width, and height.
  - b) What is the volume of the cube? Write this as a power.
  - c) Write an expression for the area of one face of the cube as a power. Evaluate the area of one face.

## 3.2 Work With Exponents, pages 110–118

3. Evaluate.
  - a)  $4^5$
  - b)  $(-3)^4$
  - c)  $\left(\frac{2}{5}\right)^3$
  - d)  $1.05^8$
4. \$100 is put into a bank account that pays interest so that the amount in the account grows according to the expression  $100(1.06)^n$ , where  $n$  is the number of years. Find the amount in the account after
  - a) 5 years
  - b) 10 years
5. Find the annual interest rate of the account in question 4.

6. The half-life of carbon-14 (C-14) is 5700 years.

- a) Copy and complete the table for a 50-g sample of C-14.

Number of Half-Life Periods	Years	Amount of C-14 Remaining (g)	Expression
0	0	50	
1	5 700	25	$50\left(\frac{1}{2}\right)^1$
2	11 400		$50\left(\frac{1}{2}\right)^2$
3			
4			

- b) Construct a graph of the amount of C-14 remaining versus time, in years. Describe the shape of the graph.
- c) Approximately how much C-14 will remain after 20 000 years?
- d) How long will it take until only 1 g of C-14 remains?

## Did You Know?

Carbon dating is a method of determining the age of fossilized creatures, such as dinosaur remains.

Scientists compare the ratio of two carbon isotopes in the sample: C-14, which is radioactive, and C-12, which is stable. Because everything on Earth has about the same ratio of C-14 to C-12 at any given time, measuring this ratio tells when the creature lived.



## 3.3 Discover the Exponent Laws, pages 119–129

7. Write as a single power. Then, evaluate the expression.
  - a)  $2^3 \times 2^2 \times 2^4$
  - b)  $6^7 \div 6^2 \div 6^3$
  - c)  $[(-4)^2]^3$
  - d)  $\frac{7^4 \times 7^5}{(7^4)^2}$

8. Simplify.

a)  $\frac{n^5 \times n^3}{n^4}$

b)  $cd^3 \times c^4d^2$

c)  $\frac{2ab^2 \times 3a^3b^3}{(4ab^2)^2}$

15. Simplify by collecting like terms.

a)  $4x - 3 + 6x + 5$

b)  $7k + 5m - k - 6m$

c)  $6a^2 - 5a + 3 - 3a^2 + 5a - 4$

d)  $3x^2 - 4xy + 5y^2 - 6 + 3x^2 + 4xy - 2$

### 3.4 Communicate With Algebra, pages 130–139

9. Identify the coefficient and the variable part of each term.

a)  $5y$

b)  $uv$

c)  $\frac{1}{2}ab^2$

d)  $-de^2f$

e)  $8$

10. Classify each polynomial by the number of terms.

a)  $x^2 + 3x - 5$

b)  $24xy$

c)  $a + 2b - c + 3$

d)  $-\frac{2}{3}$

e)  $16u^2 - 7v^2$

11. In a hockey tournament, teams are awarded 3 points for a win, 2 points for an overtime win, and 1 point for an overtime loss.

a) Write an expression that describes the number of points a team has.

b) Use your expression to find the number of points earned by a team that has 4 wins, 1 overtime win, and 2 overtime losses.

12. State the degree of each term.

a)  $3x^2$

b)  $6n^4$

c)  $17$

d)  $abc^2$

13. State the degree of each polynomial.

a)  $3y - 5$

b)  $2d^2 - d$

c)  $3w - 6w^2 + 4$

d)  $3x^3 - 5x^2 + x$

### 3.5 Collect Like Terms, pages 144–153

14. Identify the like terms in each set.

a)  $2p, 3q, -2, p, 3q^2$

b)  $5x^2, 5x, x^5, -5x^2, 3x^2$

### 3.6 Add and Subtract Polynomials, pages 154–159

16. Simplify.

a)  $(4x + 3) + (3x - 2)$

b)  $(5k - 2) + (3k - 5)$

c)  $(6u + 1) - (2u + 5)$

d)  $(y^2 - 3y) - (2y^2 - 5y)$

e)  $(2a^2 - 4a - 2) - (a^2 - 4a + 2)$

f)  $(3v - 2) - (v - 3) + (2v - 7)$

17. A rectangular window frame has dimensions expressed by  $3x$  and  $2x - 5$ . Find a simplified expression for its perimeter.

### 3.7 The Distributive Property, pages 160–169

18. Expand.

a)  $3(y - 7)$

b)  $-2(x + 3)$

c)  $m(5m - 3)$

d)  $-4k(2k + 6)$

e)  $-5(p^2 + 3p - 1)$

f)  $4b(b^2 - 2b + 5)$

19. Expand and simplify.

a)  $2(q - 5) + 4(3q + 2)$

b)  $5x(2x - 4) - 3(2x^2 + 8)$

c)  $-3(2m - 6) - (8 - 6m)$

d)  $4(2d - 5) + 3(d^2 - 3d) - 2d(d + 1)$

20. Simplify.

a)  $2[4 + 3(x - 5)]$

b)  $-3[9 - 2(k + 3) + 5k]$